Verified Translation

FEDERAL REPUBLIC OF GERMANY

(coat of arms)

Certificate of Priority Relating to the Filing of a Utility Model Application

Serial Number:	202 12 590.4
Filing Date:	August 16, 2002
Applicant/Owner:	HARTING Electric GmbH & Co KG, Espelkamp/Germany
Title:	USB-Type Plug Connector
IPC:	H 01 R 24/00

The attached documents are a correct and true copy of the original documents of this utility model application.

Munich, dated May 7, 2003

[seal of the German Patent and Trademark Office]

German Patent and Trademark Office
The President
By:
(signature)

Wehner

PRINZ & PARTNER GbR
PATENTANWÄLTE
EUROPEAN PATENT ATTORNEYS
EUROPEAN TRADEMARK ATTORNEYS

Manzingerweg 7
D-81241 München
Tel. + 49 89 89 69 80

August 16, 2002

HARTING Electric GmbH & Co. KG
Wilhelm-Harting-Str. 1
D-32339 Espelkamp

Our Reference: H 1797 DE
St/Hc

USB-Type Plug Connector

The invention relates to a plug connector which has a first type of contact and a second type of contact.

Various plug connectors are already known in which two different types of contacts are provided. Hence, there can be inserted various complementary plug connectors which have differing tasks, for instance transmitting an electrical supply power or transmitting data signals.

It is the object of the invention to provide a plug connector which makes it possible to directly poll data from an electrical device, for instance from automation devices such as a control cubicle.

For this purpose, according to the invention a plug connector is provided which comprises a housing including an accommodation chamber, and a support plate which is arranged in the accommodation chamber and divides the latter into two sections, a first type of contact being arranged in a first section and a second type of contact being arranged in a second section, the second type of contact being a USB coupling. It is possible to directly connect a PC or a monitor to the USB coupling, in order to e.g. read out the condition of the automation device or malfunction data.

According to the preferred embodiment of the invention, two USB couplings are provided which are mounted to the support plate so as to face away from each other. Each USB coupling is surrounded by a shield, a spring element being provided which connects the two shields with each other. This spring element is preferably used to connect the shields of the USB couplings with the housing, which likewise is made of an electrically conductive and, therefore, shielding material.

According to the preferred embodiment of the invention, the two USB couplings are surrounded by an insulating body which is provided with a cut-out, the spring element extending through the cut-out and resting against the housing. In this arrangement, the spring element is preferably provided with a raised middle section projecting through the cut-out towards outside. For reliably making contact with the housing there may be made provision that the middle section is provided with several contact tabs which are bent off at an angle so that they touch the housing by a sharp edge.

According to the preferred embodiment of the invention provision is made that the support plate is freely placed in the accommodation chamber and is indirectly secured by means of a fixing screw which extends through the housing and engages into the first type of contact mounted to the support plate. This makes it possible to secure the entire subassembly, comprised of the two USB couplings, the support plate and the first type of contact, in the housing by means of one single screw, so that there will be a low mounting expenditure.

It is preferably provided for that the support plate is a circuit board. This allows to electrically connect the two USB couplings without external cables.

It is preferably provided for that the housing has a mounting flange. This allows the plug connector to be firmly fitted at low expenditure to the wall of a control cubicle, for example, so that there the PC can be connected, if the need arises, by means of which the desired data can be read out.

The invention will now be described below with reference to a preferred embodiment which is illustrated in the accompanying drawings, in which:

- Figure 1 shows in a perspective view a plug connector according to the invention;

- Figure 2 shows an assembly unit inserted in the housing of the plug connector of Figure 1, and comprised of the support plate, the contact insert and two USB couplings with insulating body; and

- Figure 3 shows the assembly unit of Figure 2 without the insulating body.

In Figure 1 there is shown a plug connector 10 which has a housing 12 that is made of an electrically conductive material, in particular metal. The housing 12 is provided with a mounting flange 14 by means of which the plug connector can be mounted to a control cubicle, for instance.

Formed in the interior of the housing 12 is an accommodation chamber 16 in which an assembly unit shown in Fig. 2 can be installed. This assembly unit consists of a support plate 18 which in this case is realized as a circuit board. Arranged on one side of the support plate 18 is a first type of contact, which is embodied as a socket insert 20 here. Arranged on the opposite side of the support plate 18 is a second type of contact which is formed here by two USB couplings 22. The two USB couplings are arranged on the support plate 18 so as to point in opposite directions, and they are connected with each other by conductor tracks (not shown) in the support plate.

Each USB coupling 22 has a shield 24 which is formed by a sheet metal housing. The two shields 24 of the USB couplings are electrically conductively connected with each other by a spring element 26 (see Figure 2). The spring element 26 has a middle section raised towards outside with respect to the plane of the spring element, this middle section being provided with four contact tabs 32.

The spring element 26 is pressed against the shields 24 of the USB couplings by an insulating body 28 made of plastics. The insulating body 28 is fastened to the support plate 18 by two solder-in clips 29 and has a cut-out 30 through which the middle section of the spring element 26 including the contact tabs 32 extends.

During assembly of the plug connector, the preassembled assembly unit shown in Figure 2 is inserted into the accommodation chamber 16 of the housing 12. In so doing, the contact tabs 32 rest against the housing by means of their respective edge bent off towards outside, so that a reliable contact with the shields of the USB couplings will be produced. Then a fixing screw 34 is screwed right through the housing into a threaded hole in the socket insert 20. In this way the socket insert 20, the support plate 18, on which the socket insert 20 is fastened, as well as the USB couplings 22 which for their part are mounted to the support plate 18, will be anchored firmly in the accommodation chamber 16 of the housing 12.

Since the support plate 18 is used for dividing the accommodation chamber 16 into first and second sections, there will be obtained a particularly clearly laid out structure of the plug connector according to the invention, resulting in advantages during equipping the support plate with the USB couplings and the socket insert, as well as in a particularly simple installation of the resultant assembly unit in the housing 12.

List of reference numerals:

10: plug connector
12: housing
14: mounting flange
16: accommodation chamber
18: support plate
20: socket insert
22: USB coupling
24: shield
26: spring element
28: insulating body
29: solder-in clip
30: cut-out
32: contact tab
34: fixing screw

Claims

1. A plug connector (10) comprising a housing (12) including an accommodation chamber (16), and a support plate (18) which is arranged in the accommodation chamber and divides the latter into two sections, a first type of contact (20) being arranged in a first section and a second type of contact being arranged in a second section, the second type of contact being a USB coupling (22).

2. The plug connector according to Claim 1, characterized in that two USB couplings (22) are provided which are mounted on the support plate (18) so as to face away from each other.

3. The plug connector according to Claim 2, characterized in that each USB coupling (22) is surrounded by a shield (24), and that a spring element (26) is provided which connects the two shields with each other.

4. The plug connector according to Claim 3, characterized in that the two USB couplings (22) are surrounded by an insulating body (28) which is fastened to the support plate (18) by means of two solder-in clips (29).

5. The plug connector according to Claim 4, characterized in that the insulating body (28) is provided with a cut-out (30), the spring element (26) extending through the cut-out and resting against the housing.

6. The plug connector according to Claim 5, characterized in that the spring element (26) is provided with a raised middle section projecting through the cut-out (30) towards outside.

7. The plug connector according to Claim 6, characterized in that the middle section is provided with several contact tabs (32) which are bent off at an angle so that they touch the housing (12) by a sharp edge.

8. The plug connector according to any of the preceding claims, characterized in that the first type of contact is a socket insert (20).

9. The plug connector according to any of the preceding claims, characterized in that the support plate (18) is freely placed in the accommodation chamber and is indirectly secured by means of a fixing screw (34) which extends through the housing (12) and engages into the first type of contact (20) mounted to the support plate (18).

10. The plug connector according to any of the preceding claims, characterized in that the support plate (18) is a circuit board.

11. The plug connector according to any of the preceding claims, characterized in that the housing (12) has a mounting flange (14).